

**METHOD AND SYSTEM FOR FREEZING TISSUE SAMPLES FOR
HISTOLOGICAL AND PATHOLOGICAL EXAMINATION**

ABSTRACT OF THE DISCLOSURE

5 Viable biological material is cryogenically preserved (cryopreservation) by
immersing the material in a tank of cooling fluid, and circulating the cooling fluid past
the material at a substantially constant predetermined velocity and temperature to freeze
the material. The material may either be directly plunged into the cooling fluid without
preparation, or chemically prepared prior to freezing. A method according to the present
invention freezes the biologic material quickly enough to avoid the formation of ice
10 crystals within cell structures (vitrification) and allows the samples to maintain
anatomical structure and remain biochemically active after thaw. The temperature of the
cooling fluid is preferably between -20 degrees centigrade and -30 degrees centigrade,
which is warm enough to minimize the formation of stress fractures and other artefacts
in cell membranes due to thermal changes. Cells frozen using a method according to the
15 present invention have been shown to have a significantly less cellular and intercellular
damage than cells frozen by other cryopreservation methods used for pathological and
histological techniques. Because the present invention can freeze biological material
such that the material is vitrified, biochemical activity within the cell is not lost after
freezing and thus various embodiments of the present method may be employed in a
20 system to prepare biological material for the newer techniques of cryopathology and
immunohistochemistry in the areas of research and patient care.